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P2.107 Cleaning of the surface of beryllium armor tiles and beryllium products from beryllium-content particles

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The total area of the first wall (FW) of the International Thermonuclear Experimental Reactor (ITER) is 650 m², 40% of which is the responsibility of the RF DA. The NIIIEFA should manufacture and test 179 first wall panels (FWP), which requires 7000 high-heat-flux units and 305 000 beryllium tiles. As is known, beryllium is a toxic material, therefore stringent requirements are imposed on the permissible content of beryllium on the surface of products.

This article presents the comprehensive work performed to investigate the concentration of impurities on the surface of beryllium products. Various methods for cleaning of beryllium armor tiles and beryllium products from beryllium-content dust after thermal tests have been tried out (ultrasonic cleaning, cleaning with surface-active agents, mechanical brushing) and the impurity concentrations on the surface have been defined by the colorimetric method. The phase and element composition of the surface contamination has been studied. Experiments have been carried out to define the dependence of the impurity concentration on the storage time of beryllium armor tiles and beryllium products.

It has been found that integrated cleaning in an ultrasound bath with multi-stage rinsing ensures the best results. Optimal regimes for ultrasonic cleaning of the beryllium tiles have been developed, which provide, first, the minimum content of removable beryllium-content impurities on the surface and, second, reproducibility of the cleaning results under the conditions of serial production of beryllium products. Further works on cleaning and measuring of the surface contamination of beryllium products after thermal testing should be carried out, as their surface is complicated in geometry and large in area.

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